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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/444,689	11/22/1999	BABACK MOGHADDAM	MERL-1255	8972

7590 08/14/2002

PATENT DEPARTMENT
MITSUBISHI ELECTRIC INFORMATION
TECHNOLOGY CENTER AMERICA INC
201 BROADWAY
CAMBRIDGE, MA 02139

EXAMINER

LAROSE, COLIN M

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 08/14/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/444,689

Applicant(s)

MOGHADDAM ET AL.

Examiner

Colin M. LaRose

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 4, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Training Support Vector Machines: An Application to Face Detection" by Osuna et al. ("Osuna") and "Gender Classification of Human Faces Using Hybrid Classifier Systems" by Gutta et al. ("Gutta").

Regarding claim 1, Osuna discloses a system for recognizing faces in a scene using a support vector machine (SVM). SVMs are known in the art as trainable machines that usually classify input data into two classes, which are defined by a hyperplane. Figure 6 illustrates Osuna's hyperplane that separates face images from non-face images. After training and formulation of a hyperplane, test data is applied to the system, and the test data is then classified

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by the SVM. This conventional process of training and using an SVM is disclosed in the steps of claim 1 and is substantially employed by Osuna in a face-recognition system.

Osuna discloses a method for recognizing images of faces, comprising the steps of:

supplying a vector support machine with a plurality of training images (page 134, column 1, section 3.2: a database of face and non-face images is used to train an SVM);

determining a plurality of support vectors from the training images for identifying a hyperplane (page 130-131, section 1.1: support vectors are extracted from a data set of labeled examples; “the support vectors are the data points that lie at the border [of the hyperplane] between the two classes” (page 131, first paragraph));

supplying the support vector machine with a test image (page 134-135, section 3.2.1: system is tested using two sets of images);

classifying the test image with respect to the hyperplane (page 134, column 2, under “4.”: “classify the pattern using the SVM” and Table 2, page 135).

Osuna is silent to the method of classifying faces pertaining to gender.

Gutta discloses a hybrid classifier system that classifies images of faces based on gender using trained learning systems. Gutta’s system performs similar to that of Osuna: a training set is used to train the system, and then test images are applied and classified.

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ Osuna’s system for classifying images of faces according to gender, since determining the gender of a person is one of the basic identifying features of a person, and Gutta teaches that a trainable learning system can be used to classify face images by gender.

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Regarding claim 4, Osuna is silent to reducing the resolution of the training images and the test image by sub-sampling before supplying the images to the support vector machine.

Gutta discloses normalizing training and test images by reducing the resolution before supplying to the SVM (page 1356, section 5, first paragraph: images at 256 x 384 are reduced to 64 x 72. Pages 1356-1357, section 5, second paragraph: 2000 images are divided into two sets -- 1900 and 100; then 100 of the 1900 are used for training, and the 1800 others are used for testing). Gutta is silent to reducing the resolution by sub-sampling, however using sub-sampling to reduce the resolution of an image was conventional and well-known to those of ordinary skill in the art at the time the invention was made. Official notice taken.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Osuna by Gutta in order to reduce the size of testing and training images, since doing so reduces memory requirements and reduces training time.

Regarding claim 5, Osuna discloses maximizing a distance between the support vectors and error margins of the hyperplane (page 130, section 1.1, second paragraph: "Intuitively, a good choice is the hyperplane that leaves the maximum margin between the two classes," and also figure 1).

4. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Osuna and Gutta as applied to claim 1, and further in view of U.S. Patent 5,710,833 by Moghaddam et al. ("Moghaddam").

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Regarding claim 2, Gutta discloses passing training images to a face detection and normalization system that detects faces and scales the images to a reduced resolution (page 1356, section 5, first paragraph). However, the scaling is not performed in order to locate the faces.

Also, Gutta and Osuna are silent to warping scaled images to locate facial features.

Moghaddam discloses a method for recognizing faces and facial features in images. Moghaddam discloses scaling an input image to a number of levels (column 10, lines 41-44), and from the scaled images, finding a window that has the highest probability of containing a face (column 11, lines 1-4). Moghaddam then discloses warping the detected face to be spatially aligned with that of the training set so that features of the face may be easily recognized (column 11, lines 10-14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Osuna and Gutta by Moghaddam in order to achieve the claimed invention, since preprocessing of the training images by scaling and warping effects normalization of the training images, which facilitates the training process by placing all input images in a similar format. [See also figure 1 of "SexNet" by Golomb et al. wherein images are preprocessed by scaling and warping in order to align and normalize the faces so that features may be easy to locate.]

Regarding claim 3, Osuna and Gutta are silent to masking the scaled images to reduce the amount of hair.

Moghaddam discloses masking the scaled image to "include only an interior of the face" so that only "the most salient facial components" are present (column 11, lines 15-18).

It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify Osuna and Gutta by Moghaddam to mask the scaled images to reduce the

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amount of hair by including only the interior of the face, since hair (on the head) is not a facial feature and is therefore immaterial to determining the gender of a face.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colin M. LaRose whose telephone number is (703) 306-3489. The examiner can normally be reached Monday through Thursday from 8:00 to 5:30. The examiner can also be reached on alternate Fridays.

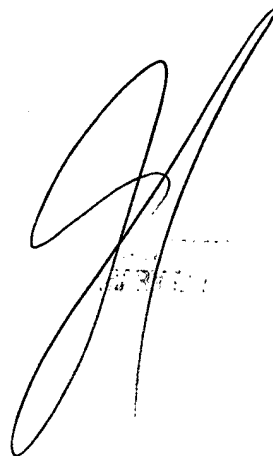
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au, can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2600 Customer Service Office whose telephone number is (703) 306-0377.

CML

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09 August 2002

A handwritten signature in black ink, appearing to be 'CML', is written over a faint, rectangular stamp. The signature is stylized with large loops.